

about 20° was observed at 9.45 p. m. The arch lasted one hour and was followed by streamers of a pale yellow color, with an apparent movement from east to west. The display disappeared about midnight.

On the 10th an aurora consisting of an arch of white light about 3° in width, extending from east to west, and resting on a dark segment, was observed at Marquette, Mich., from 8.25 to 8.55 p. m., with a few beams of pale white light.

At Buffalo, N. Y., the most brilliant aurora observed in years was noted on the 11th. The display appeared as a well-defined arch about 5° in width extending about 60° east and west of north at 8.50 p. m. At 10.48 p. m. a second arch appeared. The display ended 11.45 p. m. At Alpena, Mich., a fan-shaped aurora, with the point resting on the horizon, and a lateral movement from west to east, was observed from 10.15 to 11.55 p. m. At Bismarck, N. Dak., an aurora consisting of an irregular display of streamers in the north commenced at 9 p. m. At 10 p. m. what appeared to be an immense ball of fire was observed in the northwest quadrant, where it remained 15 minutes with very brilliant streamers having an apparent motion from east to west. The display disappeared 11.30 p. m. At Rapid City, S. Dak., an aurora was first observed at 10.30 p. m. At 11.05 p. m. an arch resting on a dark base extended from 135° to 215° azimuth and about half way to the zenith, with a few small beams of light. The display continued until the morning of the 12th.

THUNDERSTORMS.

Description of the more severe thunderstorms reported for the month is given under "Local storms."

Thunderstorms were reported as follows: East of the Rocky

Mountains they were reported in the greatest number of states, 22, on the 28th; in 15 to 20 on the 1st to 3d, 5th, 13th to 15th, 17th to 19th, 27th, and 29th; in 10 to 14 on the 6th, 8th, 11th, 12th, 16th, 20th, 24th, and 26th; in 5 to 9 on the 4th, 7th, 9th, 10th, 21st to 23d, 25th, and 30th. There was no date for which thunderstorms were reported east of the Rocky Mountains in less than 5 states.

East of the Rocky Mountains thunderstorms were reported on the greatest number of dates, 29, in Florida; on 22 in Texas; on 15 to 20 in Iowa, Kansas, Louisiana, Michigan, Nebraska, New York, and South Dakota; on 10 to 14 in Illinois, Minnesota, Missouri, New Jersey, North Carolina, North Dakota, Ohio, Pennsylvania, and Wisconsin; on 5 to 9 in Arkansas, Connecticut, Kentucky, Maine, Maryland, Massachusetts, Mississippi, South Carolina, Tennessee, Vermont, and Virginia; and on 1 to 4 in Alabama, District of Columbia, Georgia, Indiana, Montana, New Hampshire, Oklahoma Territory, Rhode Island, and West Virginia. In Delaware and Indian Territory no thunderstorms were reported.

West of the Rocky Mountains thunderstorms were reported in Arizona on the 2d, 9th, 10th, 16th, 17th, 20th to 24th, and 29th; in California on the 2d to 7th, 13th, 15th, and 21st; in Colorado on the 1st to 7th, 9th to 12th, 14th, 18th, 19th, 21st to 27th, and 30th; in Idaho on the 9th and 27th; in Nevada on the 3d, 5th to 10th, 15th, and 22d; in New Mexico on the 1st, 2d, 6th, 7th, 14th, 18th to 25th, 29th, and 30th; in Oregon on the 2d, 3d, 7th, 12th, 13th, 18th, and 28th to 30th; in Utah on the 1st, 3d, 4th, 6th, 7th, 9th to 11th, 15th, 16th, 18th, and 21st to 25th; in Washington on the 3d, 9th, 13th, 17th to 19th, 21st, 22d, and 28th; and in Wyoming on the 1st, 8th, 10th, 15th, 23d, 24th, and 27th.

MISCELLANEOUS PHENOMENA.

DROUGHT.

Very dry weather prevailed in western New England, parts of Maryland, western Virginia, central Alabama, western Florida, in Mississippi and eastern Louisiana, Tennessee, Arkansas, Missouri, Illinois, eastern Ohio, central and southern Wisconsin, Iowa, South Dakota, Nebraska, eastern Kansas, and central New Mexico. In New England a scarcity of water caused the closing of mills, and in a number of the Southern and Western States drought injured crops and caused a suspension of farm work.

Cane, rice, and cotton were injured in Louisiana. Crops of all kinds were damaged and farming operations were almost entirely suspended in Tennessee and Arkansas. Drought

was general in Illinois. In Ohio fall pastureage and the water supply were seriously affected. Streams were low and wells were failing in parts of Iowa.

PRAIRIE AND FOREST FIRES.

On the 17th and 18th extensive prairie fires were reported in parts of North Dakota, and near Rapid City, S. Dak., and on the 27th, in Emmons county, N. Dak., in northern South Dakota, and in Chippewa county, Wis.

On the 24th forest fires were reported in Barron, Polk, Washburn, Wood, Burnett, and Waupaca counties, Wis.; from the 24th to 27th near Osceola Mills, Wis.; and on the 29th in El Dorado county, Cal.

STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts and summaries are republished from reports for September, 1891, of the directors of the various state weather services:

ALABAMA.

Temperature.—The mean was 6.3 below the normal; maximum, 95, at Wiggins, 19th, 22d, and 23d; minimum, 46, at Jasper, 24th; greatest monthly range, 45, at Brewton; least monthly range, 30, at Union Springs, Citronelle, Selma, and Goodwater.

Precipitation.—The average was 0.37 below the normal; greatest monthly, 6.90, at Fort Deposit; least monthly, 0.20, at Chepultepec.

Wind.—Prevailing direction, northeast.—*P. H. Mell, Observer, Weather Bureau, Auburn, director,*

ARKANSAS.

Temperature.—The mean was 0.8 below the normal; maximum, 102, at Lead Hill, 24th; minimum, 40, at Rogers, 4th; greatest monthly range, 57, at Lead Hill; least monthly range, 22, at Winslow.

Precipitation.—The average was 2.50 below the normal; greatest monthly, 5.80, at Texarkana; least monthly, 0.00, at Gaines Landing and Harrisburgh.

Wind.—Prevailing direction, southeast.—*M. F. Locke, Commissioner of Agriculture, Little Rock, director; F. H. Clarke, Observer, Weather Bureau, assistant.*

COLORADO.

Temperature.—The mean was above the average at all stations, and at points in the Arkansas Valley was the highest on record; the maximum at Cheyenne Wells, 104, 14th, was the highest maximum on record for September; minimum, 21, at Alma, 23d, and at Cumbres, 27th.

Precipitation.—The average was greatest west of the range, and least in the upper Arkansas valley and in the southeastern counties; greatest monthly, 7.32, at Cumbres; least monthly, 0.12, at Byers.—*W. S. Miller, Observer, Weather Bureau, Denver, director.*

ILLINOIS.

Temperature.—The mean was 4.5 above the normal of the last 16 years; maximum, 100, at Pontiac, 23d, at Griggsville, 24th, at Greenville, 24th and 25th, and at Carlinville, 26th; minimum, 37, at Hennepin, 4th.

Precipitation.—The average was 2.07 below the normal; greatest monthly, 2.02, at White Hall; least monthly, 0.15, at Beason.

Wind.—Prevailing direction, southwest.—*John Craig, Observer, Weather Bureau, Springfield, director.*